

## SEQUENCE LISTING

<110> Xu, Wenfeng
 Lofton-Day, Catherine E.
 Henne, Randall
 Presnell, Scott R.
 Yao, Yue
 Novak, Julia E.
 Foster, Donald C.
 Yee, David P.

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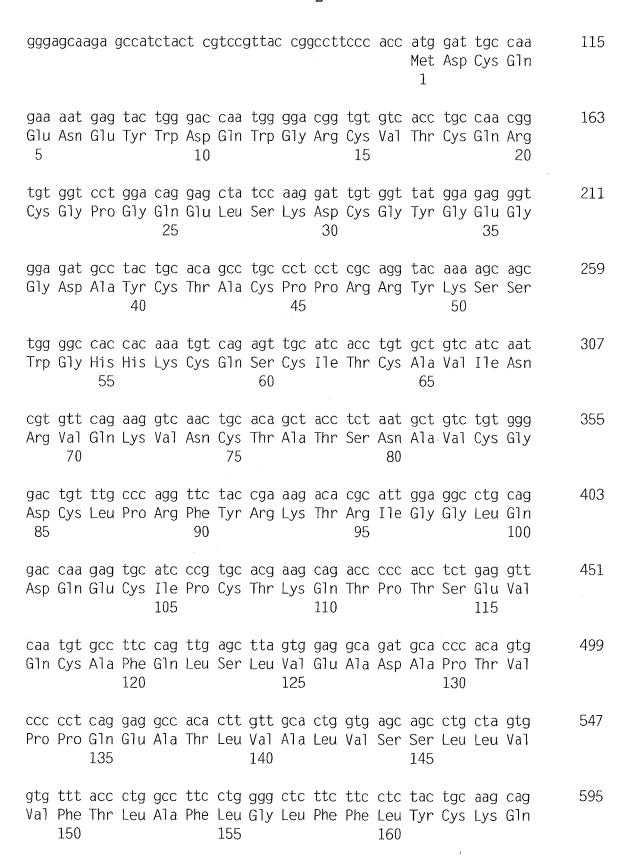
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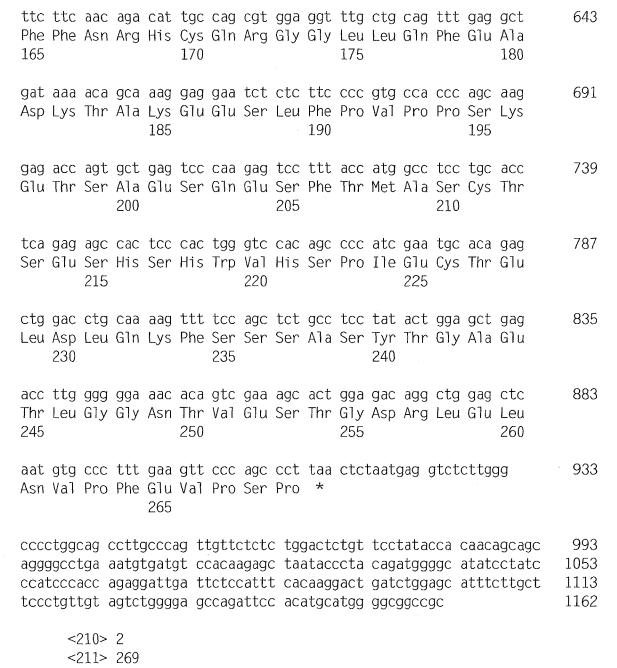
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- <222> (3)...(12)
- <223> Each Xaa is independently any amino acid residue
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- <222> (13)...(16)
- <223> Each Xaa is independently any amino acid residue
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- <221> VARIANT
- <222> (19)...(20)
- <223> Each Xaa is independently any amino acid residue

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- <222> (16)...(17)
- <223> Each Xaa is independently any amino acid residue
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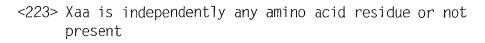
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 or not present

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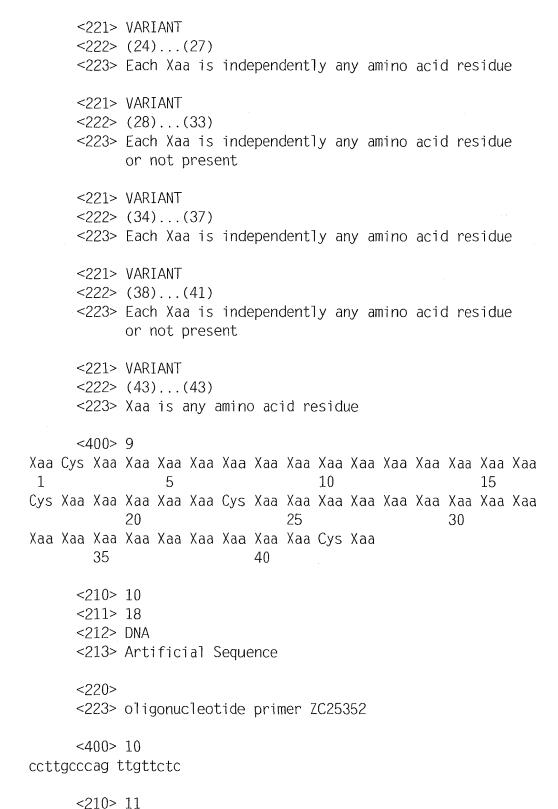
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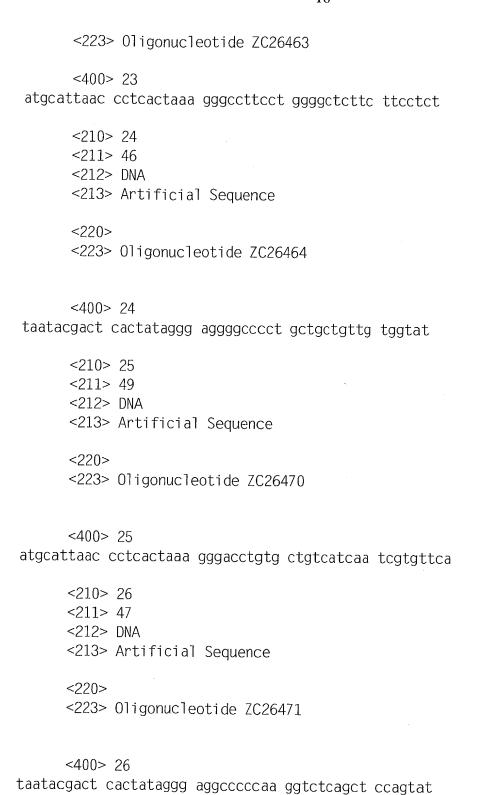
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| gtcatcaatc | gtgttcagaa  | ggtcaactgc | acagctacct | ctaatgctgt | ctgtggggac | 360  |
| tgtttgccca | ggttctaccg  | aaagacacgc | attggaggcc | tgcaggacca | agagtgcatc | 420  |
| ccgtgcacga | agcagacccc  | cacctctgag | gttcaatgtg | ccttccagtt | gagcttagtg | 480  |
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|            |             |            |            | ctaatgctgt |            | 360  |
|            |             |            |            | tgcaggacca |            | 420  |
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| -          |             |            |            | tggtggtgga |            | 660  |
|            |             |            |            | tggaggtgca |            | 720  |
| acaaagccgc | gggaggagca  | gtacaacagc | acgtaccgtg | tggtcagcgt | cctcaccgtc | 780  |
| ctgcaccagg | actggctgaa  | tggcaaggag | tacaagtgca | aggtctccaa | caaagccctc | 840  |
| ccatcctcca | tcgagaaaac  | catctccaaa | gccaaagggc | agccccgaga | accacaggtg | 900  |
| tacaccctgc | ccccatcccg  | ggatgagctg | accaagaacc | aggtcagcct | gacctgcctg | 960  |
| gtcaaaggct | tctatcccag  | cgacatcgcc | gtggagtggg | agagcaatgg | gcagccggag | 1020 |
| aacaactaca | agaccacgcc  | tcccgtgctg | gactccgacg | gctccttctt | cctctacagc | 1080 |
| aagctcaccg | tggacaagag  | caggtggcag | caggggaacg | tcttctcatg | ctccgtgatg | 1140 |
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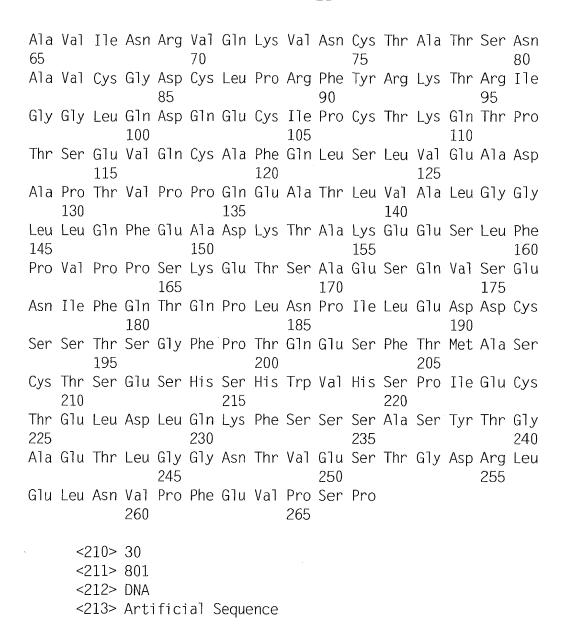
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<221> misc feature

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<223> n = A,T,C or G

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120

| tgyathacnt | gygcngtnat | haaymgngtn | caraargtna | aytgyacngc | nacnwsnaay | 240 |
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| gaycargart | gyathccntg | yacnaarcar | acnccnacnw | sngargtnca | rtgygcntty | 360 |
| carytnwsny | tngtngargc | ngaygcnccn | acngtnccnc | cncargargc | nacnytngtn | 420 |
| gcnytnggng | gnytnytnca | rttygargcn | gayaaracng | cnaargarga | rwsnytntty | 480 |
| congtnocno | cnwsnaarga | racnwsngcn | garwsncarg | tnwsngaraa | yathttycar | 540 |
| acncarccny | tnaayccnat | hytngargay | gaytgywsnw | snacnwsngg | nttyccnacn | 600 |
| cargarwsnt | tyacnatggc | nwsntgyacn | wsngarwsnc | aywsncaytg | ggtncaywsn | 660 |
| ccnathgart | gyacngaryt | ngayytncar | aarttywsnw | snwsngcnws | ntayacnggn | 720 |
| gcngaracny | tnggnggnaa | yacngtngar | wsnacnggng | aymgnytnga | rytnaaygtn | 780 |
| ccnttygarg | tnccnwsncc | n          |            |            |            | 801 |
|            |            |            |            |            |            |     |

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<210> 31
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<211> 529

<212> DNA

<213> Homo sapiens

<220>

<221> misc\_feature

<222> (1)...(529)

<223> n = A,T,C or G

## <400> 31

| <b>\400</b> - | - 2T       |            |            |            |            |     |
|---------------|------------|------------|------------|------------|------------|-----|
| ggattcnatn    | nctgaggntg | natggcnttc | nagttnwgas | tkagtggagg | cagatgcasc | 60  |
| cacagtgccc    | gcctcaggag | gycacacttg | ttgcrmtggt | gagcagcstg | ctagtggtgt | 120 |
| ttrccctggc    | cttcctgggg | ctcttcttcc | tcwacygcaa | gcagttcttc | aacagacatt | 180 |
| gycagcsgng    | gaggtttgct | gcagtttgag | gctgatraaa | cagcaaagga | ggaatctstm | 240 |
| ttycycgtgc    | cacccagcaa | ggagaccagt | gctgagtccc | aagtgagtga | gaacatyttt | 300 |
| cakacccagm    | cacttaaccc | tatcctyrag | gacgactgca | rctcgactag | tggyttcccc | 360 |
| acacaggart    | mctttaccat | ggcctyctgc | acctyagaga | gccactscca | ctgggwccac | 420 |
| arccccatcg    | aatgcacaka | gctggacctg | caaaagtttt | ccagctctgc | ctcctatact | 480 |
| ggagctgara    | ccttgggggg | aaacacagnc | aaaagcactg | ganacaggg  |            | 529 |
|               |            |            |            |            |            |     |

<sup>&</sup>lt;210> 32

<212> DNA

<213> Homo sapiens

<220>

<221> misc\_feature

<222> (1)...(401)

<223> n = A,T,C or G

<sup>&</sup>lt;211> 401

| <pre>&lt;400&gt; 32 cagttgagct tagtggaggc agatgcaccc acagtgcccc ctcaggaggc cacacttgtt gsactggagg tttgctgcag tttgaggctg ataaaacagc aaaggaggaa tctctcttns ccgtgccacc cagcaaggag accagtgctg agtcccaagt gagtgagaac atctttcaga cccagccact taaccctatc ctcgaggacg actgcagctc gactagtggc ttccccacac aggagtcctt taccatggcc tcctgcacct cagagagcca ctcccactgg gtccacagcc ccatcgaatg cacagagctg gacctgcaaa agttttccag ctctgcctcc tatactggag ctgagacctt ggggggaaac acagtcgaaa gcactggaga c</pre>  | 60<br>120<br>180<br>240<br>300<br>360<br>401 |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
| <210> 33<br><211> 528<br><212> DNA<br><213> Homo sapiens   |  |  |  |  |  |  |  |  |  |  |  |
| <pre>&lt;400&gt; 33 ctctgaggtt caatgtgcct tccagttgag cttagtggag gcagatgcac ccacagtgcc ccctcaggag gccacacttg ttgcactggt gagcagcctg ctagtggtgt ttaccctggc cttcctgggg ctcttcttcc tctactgcaa gcagttcttc aacagacatt gccagcgtgt tgcaggaggt ttgctgcagt ttgaggctga taaaacagca aaggaggaat ctctctccc cgtgccaccc agcaaggaga ccagtgctga gtcccaagtg agtgagaaca tctttcagac ccagccactt aaccctatcc tcgaggacga ctgcagctcg actagtggct tcccacaca ggagtccttt accatggcct cctgcacctc agagagccac tcccactggg tccacagccc catcgaatgc acagagctgg acctgcaaaa gttttccagc tctgcctcct atactggagc tgagaccttg gggggaaaca cagtcgaaaa cactggagac aggctgga</pre> <pre>&lt;210&gt; 34 &lt;211&gt; 175 &lt;212&gt; PRT</pre> |  |  |  |  |  |  |  |  |  |  |  |
| <213> Homo sapiens<br><400> 34   |  |  |  |  |  |  |  |  |  |  |  |
| Ser Glu Val Gln Cys Ala Phe Gln Leu Ser Leu Val Glu Ala Asp Ala<br>1 5 10 15   |  |  |  |  |  |  |  |  |  |  |  |
| Pro Thr Val Pro Pro Gln Glu Ala Thr Leu Val Ala Leu Val Ser Ser<br>20 25 30  |  |  |  |  |  |  |  |  |  |  |  |
| Leu Leu Val Val Phe Thr Leu Ala Phe Leu Gly Leu Phe Phe Leu Tyr<br>35 40 45  |  |  |  |  |  |  |  |  |  |  |  |
| Cys Lys G1n Phe Phe Asn Arg His Cys G1n Arg Val Ala G1y G1y Leu<br>50 55 60  |  |  |  |  |  |  |  |  |  |  |  |
| Leu Gln Phe Glu Ala Asp Lys Thr Ala Lys Glu Glu Ser Leu Phe Pro<br>65 70 75 80   |  |  |  |  |  |  |  |  |  |  |  |
| Val Pro Pro Ser Lys Glu Thr Ser Ala Glu Ser Gln Val Ser Glu Asn<br>85 90 95  |  |  |  |  |  |  |  |  |  |  |  |

Ile Phe Gln Thr Gln Pro Leu Asn Pro Ile Leu Glu Asp Asp Cys Ser 100 105 Ser Thr Ser Gly Phe Pro Thr Gln Glu Ser Phe Thr Met Ala Ser Cys 120 Thr Ser Glu Ser His Ser His Trp Val His Ser Pro Ile Glu Cys Thr 135 140 Glu Leu Asp Leu Gln Lys Phe Ser Ser Ser Ala Ser Tyr Thr Gly Ala 145 150 155 Glu Thr Leu Gly Gly Asn Thr Val Glu Ser Thr Gly Asp Arg Leu 165 170 175

<210> 35 <211> 299 <212> PRT <213> Homo sapiens

<400> 35

Met Asp Cys Gln Glu Asn Glu Tyr Trp Asp Gln Trp Gly Arg Cys Val Thr Cys Gln Arg Cys Gly Pro Gly Gln Glu Leu Ser Lys Asp Cys Gly Tyr Gly Glu Gly Gly Asp Ala Tyr Cys Thr Ala Cys Pro Pro Arg Arg Tyr Lys Ser Ser Trp Gly His His Lys Cys Gln Ser Cys Ile Thr Cys 55 60 Ala Val Ile Asn Arg Val Gln Lys Val Asn Cys Thr Ala Thr Ser Asn 65 75 Ala Val Cys Gly Asp Cys Leu Pro Arg Phe Tyr Arg Lys Thr Arg Ile 85 90 Gly Gly Leu Gln Asp Gln Glu Cys Ile Pro Cys Thr Lys Gln Thr Pro 100 105 110 Thr Ser Glu Val Gln Cys Ala Phe Gln Leu Ser Leu Val Glu Ala Asp 120 125 Ala Pro Thr Val Pro Pro Gln Glu Ala Thr Leu Val Ala Leu Val Ser 135 140 Ser Leu Leu Val Val Phe Thr Leu Ala Phe Leu Gly Leu Phe Phe Leu 150 155 Tyr Cys Lys Gln Phe Phe Asn Arg His Cys Gln Arg Val Ala Gly Gly 165 170 Leu Leu Gln Phe Glu Ala Asp Lys Thr Ala Lys Glu Glu Ser Leu Phe 185 190 Pro Val Pro Pro Ser Lys Glu Thr Ser Ala Glu Ser Gln Val Ser Glu 195 200 205

| Asn        | Ile<br>210 | Phe        | Gln        | Thr        | Gln     | Pro<br>215 | Leu        | Asn        | Pro        | Ile | Leu<br>220 | Glu        | Asp        | Asp        | Cys        |
|------------|------------|------------|------------|------------|---------|------------|------------|------------|------------|-----|------------|------------|------------|------------|------------|
| Ser<br>225 | Ser        | Thr        | Ser        | Gly        | Phe 230 | Pro        | Thr        | Gln        | Glu        |     | Phe        |            | Met        | Ala        | Ser<br>240 |
| Cys        | Thr        | Ser        | Glu        | Ser<br>245 | His     | Ser        | His        | Trp        | Va1<br>250 | His | Ser        | Pro        | Ile        | G1u<br>255 | Cys        |
| Thr        | Glu        | Leu        | Asp<br>260 | Leu        | Gln     | Lys        |            | Ser<br>265 | Ser        | Ser | Ala        | Ser        | Tyr<br>270 | Thr        | Gly        |
| Ala        | Glu        | Thr<br>275 | Leu        | Gly        | Gly     | Asn        | Thr<br>280 | Val        | G1u        | Ser | Thr        | Gly<br>285 | Asp        | Arg        | Leu        |
| Glu        | Leu<br>290 | Asn        | Val        | Pro        | Phe     | G1u<br>295 | Val        | Pro        | Ser        | Pro |            |            |            |            |            |

<210> 36

<211> 431

<212> DNA

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<400> 36

| ctc | tga | ggt | tca  | atg | tgc | ctt | cca | gtt | gag | ctt | agt | gga | ggc | aga | tgc | 48  |
|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| acc | cac | agt | gcc  | CCC | tca | gga | ggc | cac | act | tgt | tgc | act | gga | ggt | ttg | 96  |
| ctg | cag | ttt | gag  | gct | gat | aaa | aca | gca | aag | gag | gaa | tct | ctc | ttc | CCC | 144 |
| gtg | cca | CCC | agc  | aag | gag | acc | agt | gct | gag | tcc | caa | gtg | agt | gag | aac | 192 |
| atc | ttt | cag | acc. | cag | cca | ctt | aac | cct | atc | ctc | gag | gac | gac | tgc | agc | 240 |
| tcg | act | agt | ggc  | ttc | CCC | aca | cag | gag | tcc | ttt | acc | atg | gcc | tcc | tgc | 288 |
| acc | tca | gag | agc  | cac | tcc | cac | tgg | gtc | cac | agc | CCC | atc | gaa | tgc | aca | 336 |
| gag | ctg | gac | ctg  | caa | aag | ttt | tcc | agc | tct | gcc | tcc | tat | act | gga | gct | 384 |
| gag | acc | ttg | ggg  | gga | aac | aca | gtc | gaa | agc | act | gga | gac | agg | ctg | ga  | 431 |

<210> 37

<211> 142

<212> PRT

<213> Homo sapiens

<400> 37

Leu Gly Ser Met Cys Leu Pro Val Glu Leu Ser Gly Gly Arg Cys Thr 1 5 10 15

His Ser Ala Pro Ser Gly Gly His Thr Cys Cys Thr Gly Gly Leu Leu 20 25 30

Gln Phe Glu Ala Asp Lys Thr Ala Lys Glu Glu Ser Leu Phe Pro Val 35

Pro Pro Ser Lys Glu Thr Ser Ala Glu Ser Gln Val Ser Glu Asn Ile 50 55

Phe Gln Thr Gln Pro Leu Asn Pro Ile Leu Glu Asp Asp Cys Ser Ser 65 70 70 75 80

Thr Ser Gly Phe Pro Thr Gln Glu Ser Phe Thr Met Ala Ser Cys Thr 85 90 95

Ser Glu Ser His Ser His Trp Val His Ser Pro Ile Glu Cys Thr Glu 100 105 110

Leu Asp Leu Gln Lys Phe Ser Ser Ser Ala Ser Tyr Thr Gly Ala Glu 115

Thr Leu Gly Gly Asn Thr Val Glu Ser Thr Gly Asp Arg Leu 130 135 140

<210> 38

<211> 173

<212> PRT

<213> Homo sapiens

<400> 38

Met Asp Cys Gln Glu Asn Glu Tyr Trp Asp Gln Trp Gly Arg Cys Val Thr Cys Gln Arg Cys Gly Pro Gly Gln Glu Leu Ser Lys Asp Cys Gly Tyr Gly Glu Gly Gly Asp Ala Tyr Cys Thr Ala Cys Pro Pro Arg Arg Tyr Lys Ser Ser Trp Gly His His Lys Cys Gln Ser Cys Ile Thr Cys Ala Val Ile Asn Arg Val Gln Lys Val Asn Cys Thr Ala Thr Ser Asn Ala Val Cys Gly Asp Cys Leu Pro Arg Phe Tyr Arg Lys Thr Arg Ile 85 90 Gly Gly Leu Gln Asp Gln Glu Cys Ile Pro Cys Thr Lys Gln Thr Pro 100 105 110 Thr Ser Glu Val Gln Cys Ala Phe Gln Leu Ser Leu Val Glu Ala Asp 120 125 Ala Pro Thr Val Pro Pro Gln Glu Ala Thr Leu Val Ala Leu Glu Val 135 Cys Cys Ser Leu Arg Leu Ile Lys Gln Gln Arg Arg Asn Leu Ser Ser 145 150 155 160 Pro Cys His Pro Ala Arg Arg Pro Val Leu Ser Pro Lys 165 170

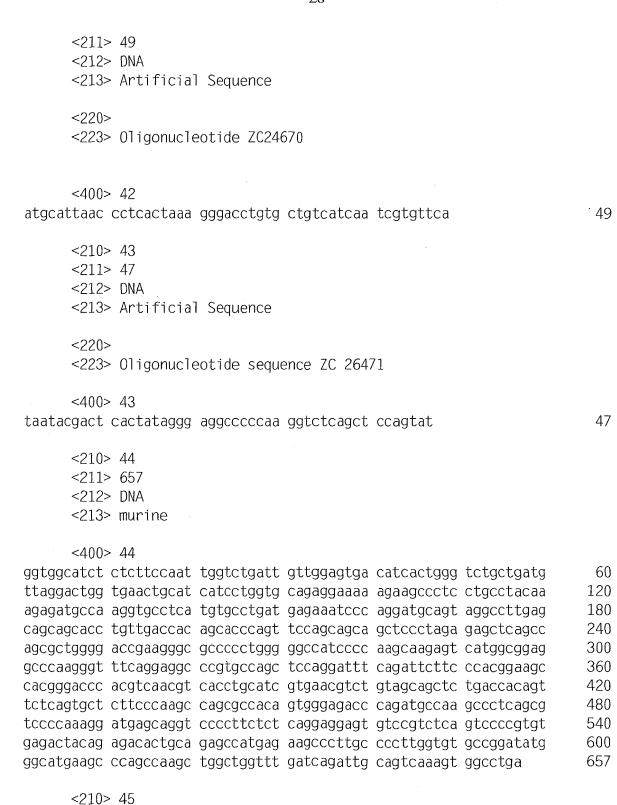
<210> 39

<211> 519

<212> DNA

| <213> Artificial Sequence  |  |
|--|--|
| <220><br><223> degenerate polynucleotide sequence  |  |
| <221> misc_feature<br><222> (1)(519)<br><223> n = A.T.C or G   |  |
| atggaytgyc argaraayga rtaytgggay cartggggmm gntgygtnac ntgycarmgn tgyggnccng gncargaryt nwsnaargay tgyggntayg gngarggngg ngaygcntay tgyacngcnt gyccnccnmg nmgntayaar wsnwsntggg gncaycayaa rtgycarwsn tgyathacnt gygcngtnat haaymgngtn caraargtna aytgyacngc nacnwsnaay gcngtntgyg gngaytgyyt nccnmgntty taymgnaara cnmgnathgg nggnytncar gaycargart gyathcentg yacnaarcar acnccnacnw sngargtnca rtgygcntty carytnwsny tngtngargc ngaygcnccn acngtncenc cncargargc nacnytngtn gcnytngarg tntgytgyws nytnmgnytn athaarcarc armgnmgnaa yytnwsnwsn centgycayc cngenmgnmg ncengtnytn wsncenaar | 60<br>120<br>180<br>240<br>300<br>360<br>420<br>480<br>519 |
| <210> 40<br><211> 47<br><212> DNA<br><213> Artificial Sequence   |  |
| <220><br><223> oligonucleotide ZC26463   |  |
| <400> 40<br>atgcattaac ceteactaaa gggeetteet ggggetette tteetet  | 47   |
| <210> 41<br><211> 46<br><212> DNA<br><213> Artificial Sequence   |  |
| <220><br><223> Oligonucleotide sequence ZC 26464   |  |
| <400> 41<br>taatacgact cactataggg aggggcccct gctgctgttg tggtat   | 46   |
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<211> 824 <212> DNA





<213> Artificial Sequence

<220>

<223> artificial cDNA sequence

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                                                                       120
accttcccgt aaatccctcc ccttcccgga attacacacg cgtatttccc agaaaaggaa
                                                                       180
ctgtagattt ctaggaattc aatccttggc cacgcgttta caccggaagt tttccatatt
                                                                       240
aggaatteet teeggtttee tttetegagg ceaeegtggt tgageeegae acteatteat
                                                                       300
aaaacgcttg ttataaaagc agtggctgcg gcgccttcgt actccaaccg catctgcagc
                                                                       360
gagcaactga gaagccaagg atccaggctg aattcatggg tctcaacccc cagctagttg
                                                                       420
teatectget ettettete gaatgtacea ggageeatat ceaeggatge gaeaaaaate
                                                                       480
acttgagaga gatcatcggc attttgaacg aggtcacagg agaagggacg ccatgcacgg
                                                                       540
agatggatgt gccaaacgtc ctcacagcaa cgaagaacac cacagagagt gagctcgtct
                                                                       600
gtagggcttc caaggtgctt cgcatatttt atttaaaaca tgggaaaact ccatgcttga
                                                                       660
agaagaactc tagtgttctc atggagctgc agagactctt tcgggctttt cgatgcctgg
                                                                       720
atteategat aagetgeace atgaatgagt ceaagteeac ateaetgaaa gaetteetgg
                                                                       780
aaagcctaaa gagcatcatg caaatggatt actcgtagtc taga
                                                                       824
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<210> 46
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<211> 47

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<213> Artificial Sequence

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<223> Oligonucleotide sequence ZC28835

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47

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<210> 47
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<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide sequence ZC 28836

<400> 47





| gcaccggtgg cctcctgagg gggcact  | 2.   |
|--|--|
| <210> 48<br><211> 29<br><212> DNA<br><213> Artificial Sequence   |  |
| <220><br><223> Oligonucleotide ZC 28830  |  |
| <400> 48<br>gcaccggtgg catctctctt ccaattggt  | 29   |
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| <220><br><223> Oligonucleotide ZC 28837  |  |
| <400> 49<br>gctctagagg ggtcaggcca ctttgactg  | 29   |
| <210> 50<br><211> 1081<br><212> DNA<br><213> Artificial Sequence   |  |
| <220> <223> DNA construct  |  |
| <400> 50   |  |
| atggattgcc aagaaaatga gtactgggac caatggggac ggtgtgtcac ctgccaacgg tgtggtcctg gacaggagct atccaaggat tgtggttatg gagagggtgg agatgcctac tgcacagcct gccctcctcg caggtacaaa agcagctggg gccaccacaa atgtcagagt tgcatcacct gtgctgtcat caatcgtgtt cagaaggtca actgcacagc tacctctaat gctgtctgtg gggactgttt gcccaggttc taccgaaaga cacgcattgg aggcctgcag gaccaagagt gcatcccgtg cacgaagcag acccccacct ctgaggttca atgtgccttc cagttgagct tagtggaggc agatgcaccc acagtgccc ctcaggaggt caccgttggc atctctctc caattggtct gatgttgga gtgacatcac tgggtctgct gatgttagga ctggtgaact gcatcatcct ggtgcagagg aaaaagaagc cctcctgcct acaaagagat | 60<br>120<br>180<br>240<br>300<br>360<br>420<br>480<br>540 |
| gccaaggtgc ctcatgtgcc tgatgagaaa tcccaggatg cagtaggcct tgagcagcag  | 540<br>600   |





| cacctgttga | ccacagcacc | cagttccagc | agcagctccc | tagagagctc | agccagcgct | 660  |
|------------|------------|------------|------------|------------|------------|------|
| ggggaccgaa | gggcgccccc | tgggggccat | ccccaagcaa | gagtcatggc | ggaggcccaa | 720  |
| gggtttcagg | aggcccgtgc | cagctccagg | atttcagatt | cttcccacgg | aagccacggg | 780  |
| acccacgtca | acgtcacctg | catcgtgaac | gtctgtagca | gctctgacca | cagttctcag | 840  |
| tgctcttccc | aagccagcgc | cacagtggga | gacccagatg | ccaagccctc | agcgtcccca | 900  |
| aaggatgagc | aggtcccctt | ctctcaggag | gagtgtccgt | ctcagtcccc | gtgtgagact | 960  |
| acagagacac | tgcagagcca | tgagaagccc | ttgccccttg | gtgtgccgga | tatgggcatg | 1020 |
| aagcccagcc | aagctggctg | gtttgatcag | attgcagtca | aagtggcctg | acccctctag | 1080 |
| a          |            |            |            |            |            | 1081 |